(15¢)

SCIENCE NEWS LETTER

Submarine New Look

See Page 200

A SCIENCE SERVICE PUBLICATION

RCA scientists—pioneers in radio-electronics—apply the "radio tube" to communications, science, industry, entertainment, and transportation.

This "magic lamp" makes Aladdin's look lazy

You will remember the fabulous lamp—and how it served its master, Aladdin. Serving you, today, is a real "magic lamp"... the electron tube.

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The electron microscope, helping in the fight against disease, magnifies bacteria more than 100,000 diameters, radar sees through fog and darkness, all-electronic television shows events taking place at a distance, radio-heat "glues" wood or plastics, Shoran locates points on the earth's surface with unbelievable accuracy, Teleran adds to the safety of air travel.

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RCA **RADIO CORPORATION of AMERICA**

GENERAL SCIENCE

Keep Scientists on Job

If universal military training is begun, our technical manpower would render best national service by being assigned to work at research projects.

By WATSON DAVIS

➤ SCIENCE and technology will be mobilized along with men, materials and money in meeting the new world emergency now before the nation.

If selective service is put into effect again and universal military training is begun, careful planning will be necessary in order that some of the mistakes of the use of technical manpower in the last war are not made again.

Less regard was given in the United States to putting the scientist and engineer into the best place for national service than in most warring nations. Even some of the key research laboratories, such as those producing the atomic bomb, had to argue long and painfully with draft boards to prevent their essential draft-age men from being pressed into shooting services.

Full-scale researches on jet propulsion, atomic bombs, biological or germ warfare, and scores of other direct military developments are underway on a relatively large scale with Army, Navy and Air Force funds.

Military Funds for Research

More fundamental researches in all fields of science and technology—ranging from the sun to the brain—are similarly supported by military funds on a long-range basis.

These military expenditures for science and technology are coordinated by a Research and Development Board, headed by Dr. Vannevar Bush who directed the famous OSRD in the last war.

There will be an immediate demand if the draft is re-enacted to keep the scientists working on these projects at their research jobs, regardless of their age.

Scientists and military officials alike are expected to recommend that clear-cut Congressional authority be given selective service to keep the scientists at the jobs they and only they can do, regardless of decisions by local draft boards. In doing this America would adopt a principle that worked well in almost every other nation during the war, Soviet Russia included.

Universal military training presents a more difficult and critical problem from the standpoint of supply of technical manpower. During the last war, thousands of scientists of the future were lost because they were drafted and not allowed to undertake basic training in college that would lead to research careers. Many educators and scientists are opposed to universal military training in fear that it would remove the potential scientists from their training at the most critical time.

Nurturing Science Ability

People possessing rare science ability must be allowed to develop and use it. That is the argument. Wasting scientific ability would be just as unwise as using precious uranium for coloring glass instead of making atomic bombs. Demands will therefore be made in UMT discussions to protect by Congressional action the intelligent use of potential scientific manpower.

The passage of the National Science Foundation bill soon to be reintroduced into Congress as a bipartisan measure may be speeded by the present emergency. Further delay in the establishment of a fundamental national science program would be illogical in the face of increased demands upon science both by the military needs and the nations to be helped by ERP.

Prompt establishment of a science foundation combined with the military research program underway would probably obviate the organization of a temporary research effort such as OSRD conducted during the war.

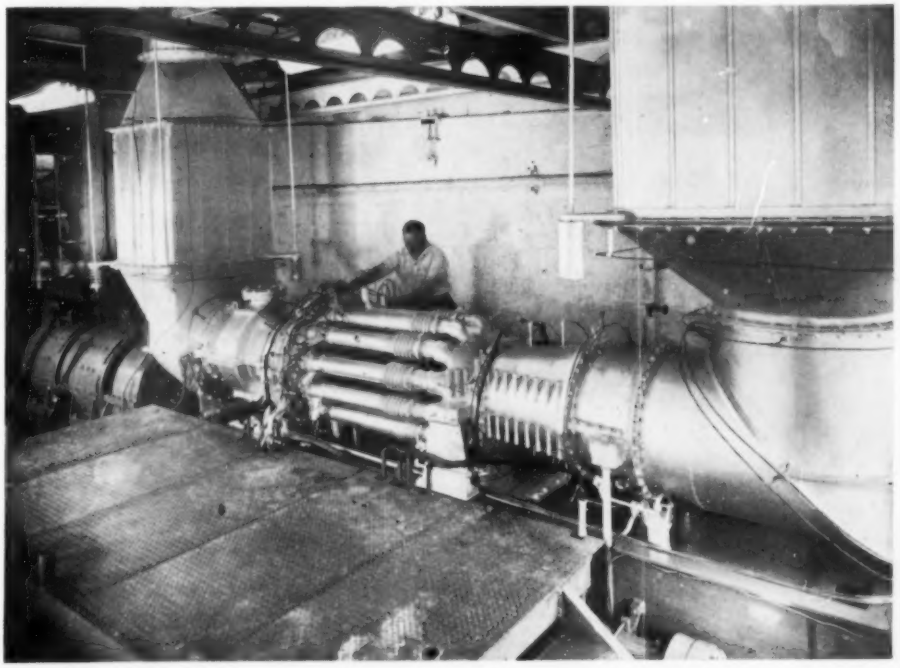
In giving aid to the 16 European nations under ERP, technical information will play a large part. One of the provisions specifically spelled out in the bill as passed by the Senate is the "procurement and furnishing of technical information and assistance."

Science News Letter, March 27, 1948

ENGINEERING

Adapt Jet Plane Research To Turbine Locomotives

➤ A MAINLINE railroad locomotive powered with a gas turbine electric drive, under construction in Pittsburgh by Westinghouse Electric Corporation, will make use of much of the knowledge gained in building jet propulsion engines for high-speed airplanes, the company revealed.



REVOLUTIONARY LOCOMOTIVE—Shown here tested under simulated railroad operating conditions is the heart of a possible "iron horse" of the future being powered with a 2,000 horsepower gas turbine.

The axial-flow compressor, heart of Westinghouse jet engines, also is being adapted to other uses than in aircraft. A 2,000-horse-power gas-turbine, suitable for locomotive or industrial use, has demonstrated the soundness of its engineering design in more than a thousand hours of testing. On the basis of these tests, the company is proceeding to build two similar gas turbines for use in a locomotive designed to compete with diesels in both traction and industrial service.

In the gas turbine, fuel such as oil, gasoline or kerosene is sprayed into compressed air in a combustion chamber. The resultant hot gases expand tremendously against rows of curved blades which spin the turbine drive shaft. For locomotives, the turbine would generate electricity for application to driving motors. An axial-flow jet engine is one in which the air scooped in for combustion sweeps in a straight line from intake to exhaust.

Science News Letter, March 27, 1948

BIOCHEMISTRY

Find Anti-Insulin Enzyme

Insulinase, as this chemical is called, has been found to destroy insulin when mixed with it. May have important bearing on diabetes.

➤ DISCOVERY of an anti-insulin chemical in the body which may have an important bearing on diabetes was announced by Drs. R. H. Broh-Kahn and I. Arthur Mirsky of the May Institute for Medical Research of the Jewish Hospital, Cincinnati, at the Atlantic City meeting of the Federation of American Societies for Experimental Biology.

Insulinase is the name they have given this chemical. It is an enzyme which rapidly destroys insulin when mixed with it. It has been found in various tissues of the body. Liver, an organ whose function is markedly impaired in the absence of insulin, is especially rich in the anti-insulin enzyme.

Since the chemical rapidly destroys insulin, it might be responsible for causing diabetes. An increase in the amount of insulinase in body tissues or an increase in its activity might destroy insulin being made in the body before insulin had a chance to perform its function of regulating sugar utilization. But, the scientists emphasized, their studies have not gone far enough for them to express an opinion on this point.

Meanwhile, possibility of helping diabetic patients in the future appears from one aspect of their work. The activity of the anti-insulin chemical, they found, can be lowered or destroyed by certain chemicals, among them copper and zinc salts. If further studies with animals show that this can be applied to man, it might lead to a decrease in the amount of insulin diabetics would need to take.

Science News Letter, March 27, 1948

MEDICINE

Stop Bleeding in Patients

➤ A FEW patients who might have bled to death because of an obscure disease are alive today, thanks to discoveries by a young University of Chicago surgeon.

Modestly and with true scientific caution, the surgeon, Dr. J. Garrott Allen, refuses to claim that he has saved any lives. But his colleagues at the university say he has. And the American Society for Pharmacology and Experimental Therapeutics at its meeting in Atlantic City awarded him its top honor, the John J. Abel $1000 prize donated by Eli Lilly and Company.

"Lasting benefit" has come to some patients treated by the method Dr. Allen discovered, the prize award announcement states.

These patients suffered from a bleeding disease that resembles but is not the same as hemophilia, the hereditary bleeding disease once known as the "curse of the Hapsburgs."

Atomic medical research, done for the Manhattan Project and the Atomic Energy Commission led to the discovery of how to control this bleeding.

Future victims of acute leukemia, as well as any potential victims of future atom bomb attacks may be helped by the discovery.

Bleeding is a troublesome feature of acute leukemia that has obscured the true picture of what is wrong in this disease. Bleeding killed many atomic bomb victims who survived the blast effects of the bombing in Japan. Bleeding is part of the radiation sickness that may come in patients getting X-ray treatments. It is a threat limiting the usefulness of these treatments and the nitrogen mustards for leukemia patients.

This bleeding, Dr. Allen discovered in dogs who get big doses of X-rays, is due to release in the blood of an anti-clotting chemical. Previously, scientists thought the bleeding after X-rays was due to disturbance of the body's natural mechanism for making blood clot when it is shed.

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The bleeding can be controlled, temporarily at least, by two chemicals. One is a blue dye, toluidine blue. The other is a basic protein, protamine sulfate. The protein is also used to make slow-action insulin for diabetics. The protein acts very quickly, stopping the bleeding in three to four minutes. The dye is slower but its effect lasts from three to five times longer.

Science News Letter, March 27, 1948

PHYSIOLOGY-ENGINEERING

Personal Air-Conditioning

Ventilated clothing was found to keep pilots comfortable and reduce the weight consumed by air-conditioning equipment for cabins on planes.

➤ VENTILATED clothing is likely to replace air-conditioned cabins in military aircraft of the future. Successful trials of the ventilated clothing were reported by Drs. E. S. Fetcher, S. I. Rapaport and John F. Hall, of the Aero Medical Laboratory, Wright Field, Ohio, at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City.

Air Force pilots were kept comfortable by their ventilated clothing at temperatures ranging from 30 degrees below zero Fahrenheit to 180 degrees above.

The ventilation was accomplished by piping air through tubing to all parts of the body. The air was kept at temperatures between 50 and 110 degrees Fahrenheit. Coveralls of coated nylon kept it close to the skin. The air was forced through the coveralls at the rate of 55 cubic feet per minute. Regardless of the type of outer clothing worn, the pilots remained comfortable because this wall of air, insulated by the outer clothing, controlled their body temperatures.

Hands and feet were purposely left out of the "ventilating circuit" because previous research had shown that no artificial heating or cooling of them is necessary in the 30 below to 180 above zero temperature range. If the rest of the body is kept warm enough, the scientists explained, the blood passing through the hands and feet will keep them comfortable. Medium-weight gloves and heavy boots were all the men needed to keep their hands and feet warm when wearing their ventilated clothing.

Military personnel other than Air Force pilots, and industrial workers whose jobs subject them to very hot temperatures, might also benefit from the ventilated clothing, the scientists suggested, although so far it is still in the experimental stage.

For the Air Forces, the great saving in weight now consumed by bulky air-conditioning equipment for cabins is an important advantage of the new clothing for personal air-conditioning.

Science News Letter, March 27, 1948

MEDICINE

Feeding Complete Meals By Vein May Be Possible

➤ COMPLETE feeding by vein instead of by mouth may be possible, preliminary studies reported at the meeting of the Federation of American Societies for Experimented Biology in Atlantic City by Drs. H. C. Meng and Smith Freeman of Northwestern University School of Medicine show. While few healthy persons would want to give up the fun of eating their food, very sick persons often are unable to eat. Feeding them by vein is now widely practiced, but they do not get complete meals in this way. Sugar, salt, vitamins and protein building blocks are all they get.

The Northwestern scientists have gone a step farther and added butter fat to the meals by vein. Two dogs fed this way for eight and 10 weeks stayed healthy and kept their weight. A slight anemia developed but did not progress.

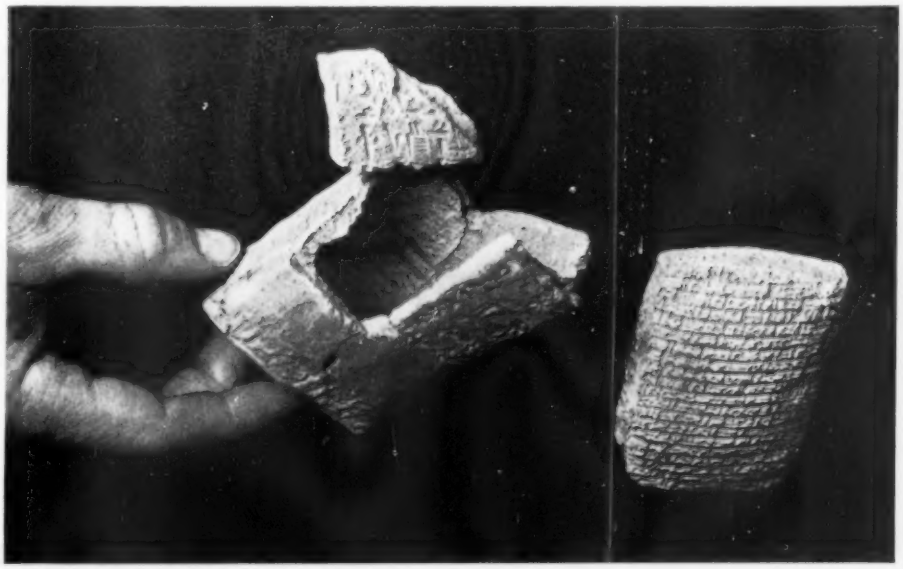
Science News Letter, March 27, 1948

PHYSIOLOGY

You Eat To Keep Warm, New Theory Suggests

➤ HOW much you eat is regulated, not by your stomach or the taste buds in your mouth, but by a tiny pea-sized area at the base of your brain, called the hypothalamus. And this brain area makes you eat more or less according to the temperature. This new theory, suggesting that the urge to eat is an urge to keep warm, was proposed by Dr. John R. Brobeck of Yale University, at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City. The theory is based on research by himself and other scientists. In the latest studies they found that rats eat less and less as the temperature goes up, in an effort to keep from getting too hot.

Science News Letter, March 27, 1948



***BABYLONIAN BRICKS**—Baking these clay tablets, a new technique developed by Prof. Ferris J. Stephens of Yale University, makes their cuneiform inscriptions more legible. (See SNL, March 20.) Here is shown a clay tablet and the envelope from which it came. The terms of the agreement were imprinted on both so that any changes could easily be detected.*

PHYSIOLOGY

Recording Track Running

➤ MINIATURE earthquakes made on the cinder track by the feet of runners sprinting for the finish line can be picked up by regular earthquake-detecting instruments, called seismometers, and recorded on portable electrocardiographs used by doctors to study heart action.

This new method of studying track running was announced by Drs. Peter V. Karpovich and Nathan Millman of Springfield, Mass., College at the meeting in Atlantic City of the Federation of American Societies for Experimental Biology.

The seismometers are placed along the track at 20-yard intervals. Direct measurements are made of the footprints left on lime sprinkled over the cinders. Time intervals are also recorded in tenths of a second.

Sprinters, the new method shows, take a longer and faster step with the right leg than with the left. This is because most people are right-handed and their left legs are stronger than their right legs, the scientists explain. Left-handed people will show the reverse. But one left-handed man is an exception. He had developed the athletic habits of a right-handed man and therefore had his left leg stronger than his right.

During distance runs no difference in length of step was observed.

Science News Letter, March 27, 1948

Poor Diet Slows Reaction

➤ AUTOMOBILE drivers who do not step on the brakes fast enough in emergencies may owe their slow reaction time to poor diet. Short rations of the B vitamin called thiamin slowed the reaction time of a group of women at the State University of Iowa, Drs. W. W. Tuttle, Marjorie Wilson and Kate Daum of that institution reported. The tests were made on reaction time to a light stimulus, but presumably the findings apply generally and to men as well as women.

Science News Letter, March 27, 1948

PHYSIOLOGY

Human Ribs Found Weak

➤ IF you want to call that rib Adam lost in the Bible story a "weak sister", your pun won't be far wrong. All human ribs are relatively weak, Drs. Milton H. Joffe and F. A. Hitchcock of Ohio State University reported at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City. It takes less than 20 pounds pressure to break a rib, they found.

The pressure required to break ribs was investigated in a study intended to gather facts about the strength of the human body for proper design of safety equipment. The study is said to be the first such ever made. The effects on the body of severe deceleration of aircraft is the primary objective of the study, but industrial workers as well as aviators will benefit from the findings.

The ribs are generally credited with providing protection for vital organs of the body against injury from crushing or body blows. But the major portion of the strength of the chest, Dr. Joffe now believes, comes not from the ribs alone but from the combination of these and the many muscles of chest and abdomen.

Ribs can absorb energy in the range of 10 to 100 inch pounds. But the chest can absorb energy up to 1000 foot pounds or more. Since all ribs show the same mineral content and structure, the studies show how much of the chest's strength comes from muscles.

Science News Letter, March 27, 1948

VETERINARY MEDICINE

Human Brucellosis Remedy Too Costly for Animals

➤ FARMERS and stockmen were warned against hoping to use a newly reported treatment for brucellosis, or undulant fever, to wipe out the disease in their cattle.

The treatment, consisting of a combination of the mold remedy, streptomycin, and a sulfa drug, has been successfully used to treat human brucellosis patients. But it would not be practical for use in treating cows, pigs or goats.

"Cost of the treatment is prohibitive from the standpoint of most farm budgets and therefore it would be warranted only for extremely valuable animals," Dr. J. G. Hardenbergh, executive secretary of the American Veterinary Medical Association, Chicago, stated.

"Moreover, there is no assurance that it would produce the same results as it does in human beings."

A program now widely used for controlling brucellosis in livestock involves blood-testing to detect the disease, vaccination to prevent it, and segregation and slaughter of infected animals.

About 2,000,000 cattle and "very large" numbers of swine in the United States have the disease. Sheep, goats, horses, dogs, cats, poultry and wildlife may also harbor the infection. Its principal effect on animals is to cause abortion. In humans, it produces fever, chills and dizziness that keep recurring. Humans get the disease by contact with infected animals or by consuming unpasteurized milk from diseased cattle and goats.

Science News Letter, March 27, 1948

PHYSIOLOGY

Dogs Can Digest Starches, Experiments Indicate

➤ DOGS can digest and assimilate starchy foods, despite widespread notions to the contrary. And bones, though doubtless fun for Fido, are not essential.

These apparent heresies are offered by research veterinarians on the staff of the Ralston Purina Company, which includes prepared dog foods in its list of products. Their experiments showed that dogs can digest foods made from wheat and other grains, as well as the oft-forbidden potato. Dogs even thrive on diets that include sugar.

The veterinarians call attention to the fact that the classic experiments establishing the function of insulin in controlling the blood sugar level were performed on dogs. This would not have been possible if the dogs were not physiologically adapted for a diet consisting in part of carbohydrates.

Although dogs like red meat just as humans do, it is not in itself adequate for their whole diet. Dogs kept on an all-red-meat regimen soon became seriously ill.

Dog owners are advised against trying to treat their pets as if they were human beings, accustomed to three meals a day—and eating too much at that. They should be fed things that dogs like rather than things people like, and owners not be too shocked if they show a perfectly natural preference for smelly tidbits out of the garbage-can.

Science News Letter, March 27, 1948

VETERINARY MEDICINE

Study Animal Virus Abroad

American scientists will set up study program in Europe to combat foot and mouth disease. Will visit England, Netherlands, Denmark and Switzerland.

➤ THREE U. S. Department of Agriculture veterinarians have sailed for England to set up a new arsenal in the war against foot and mouth disease which has been threatening to invade this country from Mexico.

The scientists, Drs. L. O. Mott, Howard W. Johnson and E. A. Eichhorn, will work at European foot and mouth disease laboratories. They are taking trunkloads of laboratory equipment to conduct experiments in cooperation with European scientists. Other groups from the Department of Agriculture will probably be selected soon for European work.

First stop for the scientists is Pirbright, England, about 30 miles west of London, where Britain has a research center for study of the disease which is threatening America's meat supply. The Department of Agriculture scientists will also visit foot and mouth disease laboratories in the Netherlands, Denmark and Switzerland.

Meanwhile, a U. S. center for research on the disease is in the real estate stage. Congress is considering legislation which would appropriate funds for an island station where experiments could be conducted with diseased animals without danger of spreading the dread virus. Agriculture officials are shopping around for the island.

The new "Alcatraz" for foot and mouth infected animals is expected to be on the East Coast. Several sites near Long Island have been investigated by officials who will decide on the location.

When the island laboratory is set up, scientists expect to concentrate on new and improved vaccines for combatting foot and mouth disease. The new station will be "roughly modeled" on a similar German research center, now in the hands of the Russians.

The German station is on the island of Riems, a couple of miles off the Baltic Coast of Germany near Greifswald. One of the world's foremost authorities on foot and mouth disease, Dr. Otto Waldmann, has directed work on this island for more than two decades. When the U. S. S. R. first occupied the island, which is near the famous rocket experiment station at Peenemunde, the foot and mouth disease laboratory was taken down and removed to Russia. Latest report is that the equipment has been returned to Riems, and that Dr. Waldmann is continuing to direct his work there.

The American scientists in Europe have no plans for visiting the German island, but some Department of Agriculture officials were there before World War II.

Science News Letter, March 27, 1948

METEOROLOGY

Fingerprint Snow Crystals

➤ SNOWFLAKES falling on a special paper in a new automatic instrument leave a record of their size and shape, how densely together they fell and the number that landed in a given area.

This new snow crystal fingerprinting instrument has practical applications in weather studies. It makes it possible to count the snow crystals in a storm and thus provide information about the numbers of fine nuclei in the atmosphere. These are the fine particles of dust or other material which are necessary to keep a storm active.

Teamed with other devices, the instrument is now being used to help determine how brightness of the sky and how the flow of electric current from the atmosphere to the ground are affected by a snowstorm.

The snowflake recorder is a development of General Electric, Schenectady, N. Y. The co-developers were Vincent J. Schaefer, the scientist who first made an artificial snowstorm by sprinkling powdered dry ice in a super-cooled cloud from an airplane, together with Raymond E. Falconer and William Kearsley.

The special paper used for recording is coated with water-soluble dye. A small amount of heat is applied to its under surface. This heat is just enough to cause the snowflakes to melt immediately upon contact, leaving dark blue impressions of the crystals. Operating automatically, the instrument exposes the paper to the storm for one minute at 15-minute intervals. This is sufficient to record a storm's history.

Science News Letter, March 27, 1948

ASTRONOMY

Two Comets Discovered By European Astronomers

➤ POLITICAL events are not the only news from Czechoslovakia. Czech astronomers have discovered a new comet, it was reported by Harvard College Observatory, clearing house for astronomical findings.

The tenth-magnitude comet was spotted from the Skalnate Pleso observatory in eastern Czechoslovakia. It is called comet Pajdusakova-Mrkos, in honor of the astronomers who made the discovery.

A brighter new comet, of the eighth magnitude and visible through small telescopes, has been reported from the Netherlands and named Comet Keuskamp.

The new discoveries bring the number of new comets spotted thus far in 1948 to four.

Science News Letter, March 27, 1948

***SNOW CRYSTAL RECORDER—** This instrument, which prints on paper the geometric shape, size and frequency of occurrence of snow crystals falling in a storm, is shown being observed by one of the men who developed it—Raymond E. Falconer.*

AERONAUTICS

New Navy Helicopter Has All-Metal Rotor Blades

➤ ALL-METAL rotor blades feature a new Navy helicopter just revealed. But nylon replaces metal in its fuel tanks, and a hatch in the floor permits the use of the craft in aerial photography.

This new experimental helicopter, built by Sikorsky Division, United Aircraft Corporation, Bridgeport, Conn., will be known as the XHJS-1 in the service. It has a maximum capacity of five persons, including the crew. It is specially designed for utility, rescue and observation work aboard aircraft carriers, battleships and cruisers.

It is a one-engine affair, and has a tail construction that makes it resemble the conventional airplane more than do other helicopters. Its tail rotor has been attached to an arm projecting upward at an angle from the tip of the tail cone. This raises the revolving blades above head level, making it safer for shipboard personnel, and will prevent the blades from striking the deck in landing in a heavy sea.

Science News Letter, March 27, 1948

ENGINEERING

"Yon Bonnie Banks" Are New Power Station Site

➤ IF ANY Americans are still suffering from sentimental qualms about TVA and the big dam construction projects planned for the Missouri River Valley, let them consider the plight of the Scots.

Loch Lomond, celebrated in the song dear to the hearts of many persons on both sides of the Atlantic, is to be involved in a new hydroelectric power development. London papers report that nearly $200,000,000 will be spent on the project in the Scottish highlands.

Loch Sloy, a lake near Lomond, is being dammed. Water will be carried off in a two-mile tunnel through Ben Vorlich, a mountain.

And "On yon bonnie banks" will be the Sloy power station, on the west shore of Loch Lomond.

Science News Letter, March 27, 1948

WILDLIFE

American Biologists Are Surveying Cuban Birds

➤ AMERICAN biologists have begun a survey of the birds that winter in Cuba, the second Latin American country to request aid from this country in studying its wildlife resources.

Three biologists of the U. S. Fish and Wildlife Service went to Cuba to make the bird survey. Although several Latin American countries have requested help in the development of their fishery resources, Director Albert M. Day of the Fish and Wildlife Service said that Guatemala is the only other country in South or Central America which has asked for U. S. assistance in a study of its wildlife resources.

The Cuban survey will help in planning future conservation programs to protect migratory birds all along their travels.

Frederick C. Lincoln, assistant to the director of the Fish and Wildlife Service, will head the group in Cuba. Other American scientists studying Cuban birds will be Allen J. Duvall and Thomas D. Burleigh, both of the Service's Division of Wildlife Research.

Science News Letter, March 27, 1948

FORESTRY

Preventing Floods Is Problem of the Land

➤ PREVENTING floods is a land job and not merely a water problem, Lyle F. Watts, chief of the U. S. Forest Service, declared.

The Department of Agriculture scientist discussed flood prevention as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Floods result from "any upsetting of the natural balance between the soil and its ability to take in water, store it and control its run-off," Mr. Watts explained.

Causes of floods, as listed by the Forester, include:

Forest fires, excessive timber cutting, careless logging practice, over-grazing, and other abuses of land.

The forest and woodland areas, pastures and croplands at the headwaters of streams are where the flood problem begins, he said.

"What happens to a watershed," Mr. Watts declared, "is very often determined by who owns it."

He advocated public ownership of key watershed areas, citing Akron, Ohio, and Asheville, N. C., as cities that have bought up areas furnishing their water supplies.

But in most instances, watersheds involving flood hazards are under private ownership, the scientist reported.

Science News Letter, March 27, 1948

IN SCIENC

ENGINEERING

Underwater Speed Greater In Streamlined Submarines

See Front Cover

➤ NAVY submarines are getting that new streamlined look. Called the "Guppy" program, the alterations involve streamlining the hulls of the fleet submarines by reducing the size of their superstructure and by removing deck guns and other topside appendages to cut down under-water resistance and increase their submerged speed, as shown on the cover of this week's SCIENCE NEWS LETTER.

These alterations are based upon research conducted by the Navy during and after World War II and on German U-boat developments. Several submarines have already been altered under this program and their trials are now being conducted in both Atlantic and Pacific waters.

Science News Letter, March 27, 1948

CHEMISTRY

Recover Diamond Dust By New Simple Process

➤ DIAMOND dust from polishing tools used in General Electric's laboratories at Schenectady, N. Y., are recovered for re-use by what is claimed as a relatively new and simple process. Over 1,000 carats of this dust were recovered during the past year.

One use made by G. E. of the diamond dust, a material as fine as face powder, is to polish dies of tungsten carbide, one of the hardest compounds yet devised by man. In use the dust falls into a receptacle along with oil, tungsten carbide powder and bits of bristles and rags. In the recovery process all can be burned off except the tungsten-carbide and diamond dusts.

This residue is washed with concentrated hydrochloric acid which oxidizes the tungsten. Tungsten is hard to dissolve, but by placing the mixed powders in a furnace at 800 degrees Centigrade the tungsten oxide is converted into tungsten trioxide which is easily dissolved in a solution of sodium hydroxide, commonly known as caustic soda.

Science News Letter, March 27, 1948

NCE FIELDS

CHEMISTRY

Check "Weed" Bacteria in Penicillin Mold with 2,4-D

➤ 2,4-D checks microscopic weeds in the laboratory as well as big ones in fields of cane or corn. Certain air-borne bacteria play the part of weeds in "crops" of *Penicillium notatum*, the mold that produces penicillin, stealing nutrients intended for it and inhibiting its growth. Two U. S. Department of Agriculture botanists, Elmer C. Stevenson and John W. Mitchell, have discovered that weak solutions of 2,4-D, from .02% to .08%, will prevent the growth of the bacteria without damage to the mold. The same treatment can be used for the protection of certain species of plant-disease fungi when these are intentionally grown for experimental purposes.

U. S. patent 2,437,766 has been issued on this discovery; rights are assigned royalty-free to the government.

Science News Letter, March 27, 1948

CHEMISTRY

Poison Ivy Chemical Now Imitated Synthetically

➤ URUSHIOL, which is the blistering compound that makes poison ivy such an intolerable nuisance, has been successfully imitated in a synthetic compound put together in the chemistry laboratories of Columbia University by Prof. Charles B. Dawson and Dr. David Wasserman. The new compound resembles the natural product not only in basic chemical structure but in physiological effects as well. Dr. Harry Keil of the New York Post-Graduate Medical School and Hospital is investigating this phase.

First use of the new synthetic ivy-poison analog may be for inoculation against poison ivy and its relatives, poison sumac and the poison oak of the Pacific Coast region. Principal value of the synthetic poison, however, will be in gaining a better understanding of the natural blister-raising substances, not only in native American plants but in Oriental lacquers and related materials which are derived from a small tree belonging to the sumac family.

Urushiol, the group-name of the poisonous principle in all these plants, both American and Asiatic, comes from the Japanese phrase that means "lacquer-tree". It was coined in 1909 by a Japanese scientist named Majima, who was the first to isolate the poisonous, blister-raising compound. Later the close chemical kinship of poison ivy's toxin was demonstrated in this country.

Financial support for this research has been given by a New Jersey firm, the Irvington Varnish and Insulator Company. One of their best raw materials is an oil from the shells of cashew nuts. Botanically related to poison ivy and the poisonous Oriental lacquer tree, the cashew tree produces skin irritations resembling those of poison ivy. The company is therefore interested in obtaining a better knowledge of this toxic principle, for the better protection of its workers.

Science News Letter, March 27, 1948

ENGINEERING

Mud for Well Drilling Tested by New Apparatus

➤ THERE will be no "guess" in the so-called mud used in drilling deep wells if the mixture is laboratory tested in new apparatus developed by Norman E. Martello of Calgon, Inc., Pittsburgh.

The apparatus is relatively simple and inexpensive to construct. It circulates the mud mixture through it by a large centrifugal pump. The mud flows through a heated section where conditions encountered in action in the earth are simulated. A valve arrangement traps mud samples for viscosity checking. This viscosity can be checked periodically without withdrawal from the equipment. Chemicals may be added to the mud at any desired stage in the test period.

This mud is an essential in deep-well drilling. It is usually a mixture of certain clays, chemicals and water. It is pumped down the hollow shaft of the bit stock, lubricates and cools the cutting edge, and brings the debris from the bit to the surface through the bore outside the drill shaft. Another important function of the mud is to coat the walls of the bore, and also to hold back the oftentimes tremendous gas pressure encountered.

Modern drilling methods would be impossible without mud of low viscosity. In the well, the mud is being agitated and heated concurrently for long periods. These conditions may cause changes in the clays and the ordinary treating chemicals by complex reactions involving base-exchange, hydration or dehydration, or adsorption.

Science News Letter, March 27, 1948

AERONAUTICS

"Sweat-Cooling" System Aids Jet Engine Efficiency

➤ A "SWEAT-COOLING" system which operates in somewhat the same way as the body's perspiring has been found to increase the efficiency of turbo-jet engines, Dr. Pol Duwez of the jet propulsion laboratory, California Institute of Technology, told a national flight propulsion meeting of the Institute of Aeronautical Sciences in Cleveland.

Relatively large amounts of coolants are forced through porous metal walls of the combustion chamber at low pressures, Dr. Duwez explained. The common gases, nitrogen and hydrogen, have been found the most satisfactory coolants.

The coolant, forced in through the metal wall, forms a layer of gas between the wall of the chamber and the hot flame. This protects the chamber wall and reduces the heat loss.

In addition to increasing the efficiency of jets, the "sweat-cooling" will permit the use of different materials, in some cases ones less strategic or not in short supply.

Science News Letter, March 27, 1948

GENERAL SCIENCE

Rare New Zealand Parrots Eat Mutton, Not Crackers

➤ A TRIO of hard-to-please "Pollys" have arrived at the Balboa Park Zoo in San Diego, Calif.

The newcomers are three parrots that want meat—the fat lying about the kidneys of sheep, if you please—instead of the traditional crackers or the usual vegetarian diet of parrots.

Called keas, the meat-eating parrots are from South Island, New Zealand. They are rare even in New Zealand, probably because their unusual diet has not endeared them to sheep-raisers.

The keas' un-parrotlike taste for mutton is believed to be only about 80 years old. The kea formerly was a vegetarian in the manner of more common species. But they learned to eat meat during winter visits to the lowlands. Since then, hundreds of the birds have been killed by irate sheepmen.

Keas have a dull greenish-brown plumage and boast long, hooked bills.

The three keas in the San Diego zoo are the first brought to this country in several years.

Science News Letter, March 27, 1948

ASTRONOMY

Venus Now "Evening Star"

This planet exceeds by about 110 times the brilliance of the bright star Aldebaran, and becomes visible before any other star or planet comes into view.

By JAMES STOKLEY

➤ EXCEPT for the moon, the most brilliant object to be seen in the sky on April evenings is the planet Venus, which is now the "evening star." Its position is shown on the accompanying maps, which give the appearance of the sky about 10:00 p.m. at the beginning of the month and an hour earlier at the middle. Venus is in the constellation of Taurus, the bull, almost directly west, and a little north of the bright star Aldebaran. However, the planet exceeds the star in brilliance about 110 times, so it is visible long before any other star or planet comes into view.

Though brightest, Venus is not the only planet seen at present in the evening. Two others are high in the south, to the right of the hook-shaped group of stars in the constellation of Leo, the lion, known as the sickle. The one to the left, reddish in color, is Mars, which was so bright when it approached the earth in February. Now it is receding from our part of the solar system and is rapidly becoming fainter, so in April it is just about equal to Saturn. The latter, by the way, is just across the border, in the next-door constellation of Cancer, the crab.

Stars of First Magnitude

Several stars of the first magnitude appear in the April evening skies. Aldebaran, in Taurus, has already been mentioned. Another is Regulus, which is in Leo, at the end of the handle of the sickle. To the southwest there is Sirius, in Canis Major, the greater dog, near the horizon. Directly west is Orion, the warrior, with Betelgeuse, and above him we find Gemini, the twins, with first-magnitude Pollux. Below and to the left one sees Canis Minor, the lesser dog, with Procyon.

Across the southeastern sky there spreads the large constellation of Virgo, the virgin, of which Spica is the brightest star. Just above it is Bootes, the bear-driver, in which Arcturus shines. Low in the northeast Vega, in Lyra, the lyre, is just beginning to appear. Though this also is of the first magnitude, it does not seem so. Because it is so low, the earth's atmosphere absorbs much of its light, and it looks much fainter. Later in the night, however, or later in the year during the evening, Vega is seen at full brilliance high overhead.

The big dipper, in the north, is now in its best position of the year. This familiar group is part of Ursa Major, the great bear. Below it, as indicated by the "pointers," is Polaris, the pole star, part of the little dipper, which in turn, is part of Ursa Minor, the lesser bear.

Jupiter Brighter than Mars

Another planet, Jupiter, rises in the east in the constellation of Sagittarius, the archer, about midnight. It is about nine times as bright as Mars or Saturn, though much fainter than Venus.

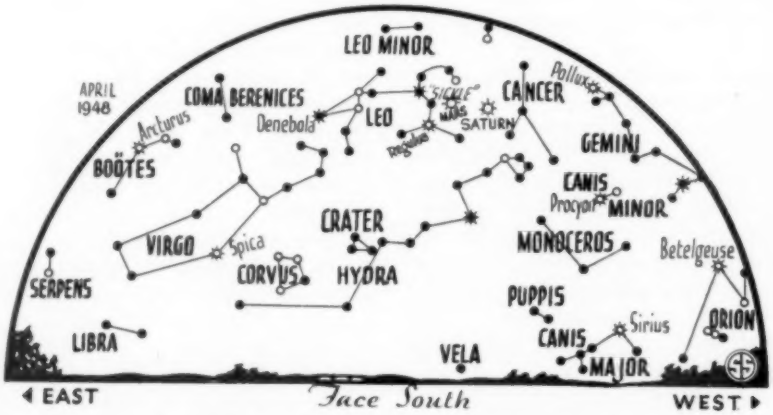
If you have been watching the skies attentively during the last few months, you recall that late last fall Venus first appeared in the western evening twilight, shining brightly there but setting soon after the sun. Since then she has been setting later and later, and all the time was increasing in brightness. On April 14 the planet will be farthest east, and will remain in the sky for about four hours after the sun has departed. After that it will start approaching the sun again, and by the end of June will be gone from the evening sky completely. During July, however, one will see it in the east, just before sunrise, and it will shine, as the "morning star," during the rest of the year. On Sept. 3 it will be at the greatest distance west of the sun, and will then rise longest before sunrise.

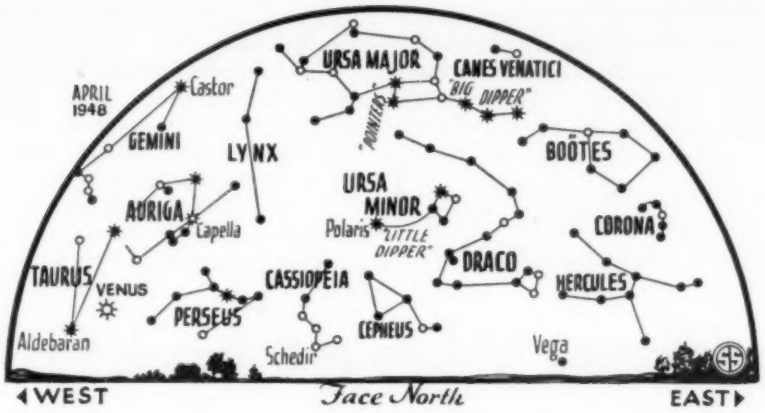
After that Venus will again draw toward the sun, though much more slowly, and a year from now it will be completely out of sight. But in the summer and autumn of 1949 it will repeat its behavior of recent months, again coming into brilliant view in the evening.

The reason for this is that Venus moves around the sun in an orbit that is smaller than that of earth. Whereas our average distance from the sun is about 93,000,000 miles, that of Venus is only 67,200,000 miles. It goes around the sun once in 225 days, where we take 365. When Venus, earth and sun are in line we say that Venus is in conjunction with the sun, calling it inferior when the planet is on this side of the sun and superior when it is on the farther side. It will be in inferior conjunction on June 24, and superior conjunction April 16, 1949.

Venus Having Change in Phase

After it passes behind the sun, it swings to the east of that body, and then remains in the western sky after sunset, as at present. It sets latest when, as on April 14, it reaches greatest distance from the sun in the sky. At the same time, as shown by a telescope, it is undergoing a change in phase, just like the moon. Like all the planets, Venus has no light of its own, but shines by reflected sunlight. When out beyond the sun, the entire sunlit hemisphere is visible and we can see it in full phase. Then, as it swings away





from the sun and towards us, more and more of the sunlit hemisphere is turning away, so it reaches a "half-moon" phase and then a crescent.

Unlike the moon, however, as it becomes a crescent it comes closer to earth, and thus appears bigger in the sky. This makes it brighter, even though we cannot see as much of the illuminated part as before. The brightest time of all comes when it is a crescent similar to that of the moon five days after it is new. It will be that way on May 18.

One reason that Venus is so bright is that it is constantly covered with clouds, which reflect from their tops about 50% of the sunlight falling on them. In contrast, the moon, of which we can see the true surface, reflects only about 7%. Because of this constant layer of clouds, we cannot tell by observation what the surface of Venus looks like. It has not been possible to tell exactly how long the day of Venus is—that is, how long it takes to turn on its axis. That it is about 30 of our days seems the most reasonable estimate at present.

Since it has clouds, Venus obviously has an atmosphere and studies made with the spectroscope, attached to large telescopes, have given us some notion of its constitution. It contains no appreciable oxygen, or water vapor, but a great deal of carbon dioxide can be detected above the clouds. Since this gas is heavier than our air, where it is present in about three parts in 10,000, it is probably even denser on Venus below the clouds, so that life such as ours would probably be suffocated there. Thus, science fiction writers to the contrary notwithstanding, it seems very unlikely that there is any life on Venus.

Time Table for April

April	EST	
1	5:25 a. m.	Moon in last quarter
	6:00 a. m.	Neptune nearest, distance 2,721,000,000 miles
4	1:00 a. m.	Moon farthest, 251,800 miles
9	8:16 a. m.	New moon
13	3:09 a. m.	Moon passes Venus
14	11:00 p. m.	Venus farthest east of sun
16	2:42 p. m.	Moon in first quarter
17	8:40 p. m.	Moon passes Saturn
18	4:50 a. m.	Moon passes Mars
19	8:00 p. m.	Moon nearest, 228,000 miles
23	8:28 a. m.	Full moon (a very slight partial eclipse of the moon will be visible at this time from the extreme western and northwestern parts of North America and much of the Pacific Ocean, Asia and Australia).
27	12:57 p. m.	Moon passes Jupiter
30	11:48 p. m.	Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, March 27, 1948

MEDICINE

Surgery Aids Mentally Ill

A NEW brain operation which has restored 20 out of 24 helplessly sick mental patients to health was announced at a meeting at the New York Academy of Medicine.

The operation consists in cutting away certain areas of the frontal lobes of the brain. It is done for patients who are hopelessly depressed and show symptoms such as anxiety, obsessions, compulsions, and marked emotional tension.

A team of 100 psychiatrists, surgeons, psychologists and other medical scientists worked to develop the new operation. They are associated with Columbia University College of Physicians and Surgeons in New York, the New Jersey State Hospital at Greystone Park, and the New Jersey State Department of Institutions and Agencies at Trenton. Because they feel that the results were due to their work as a team, they refuse to reveal any of their names.

Of the 24 patients operated on, 11 have left the hospital and are back at home and 10 are back at work.

Science News Letter, March 27, 1948

"MAN'S MIND IS MAN HIMSELF"

LIPPINCOTT
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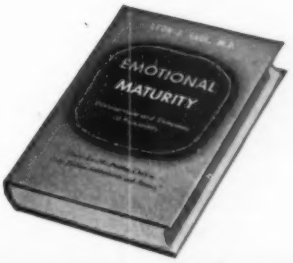
HUMAN BEHAVIOR



EMOTIONAL MATURITY

The Dynamics Of Personality

by Leon J. Saul, M.D.

WE believe this to be the first book based on thorough-going psychoanalytic principles. Taking the *normal* as its point of departure, it breaks down the accustomed distinction between normal and abnormal and presents a common basis for the whole range of human behavior. $5

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Do You Know?

As *oranges* ripen, the juice volume and sugar content increase, while acidity decreases.

Truck traffic is increasing more rapidly than any other type of highway transportation.

Heated trucks for *snow removal* are being considered; the snow would be melted in them and emptied into nearby drainage openings.

The number of persons admitted to American *mental institutions* each year is nearly as large as the number who are graduated from colleges.

GENERAL SCIENCE

Criticize Attacks Made on Loyalty of Scientists

➤ FIVE member-societies of the Federation of American Societies for Experimental Biology passed resolutions criticizing charges against the loyalty of scientists. The resolutions were passed at the Federation meeting in Atlantic City.

The American Physiological Society warned that "the effect of such attacks is to discourage loyal scientists and other citizens from entering government service," and to "distract and intimidate" many now in the government.

Science News Letter, March 27, 1948

TECHNOLOGY

Assembly-Line Eating Is Invention of English Trio

➤ EATING in restaurants is put on an assembly-line basis by a highly mechanized beanery, the invention of a trio of Englishmen, T. M. Lewis, E. G. Rounce, and C. G. H. F. Dunham. Their design shows all the earmarks of the exasperation born of standing endlessly in line waiting for a table to be vacated by a group of lingerers over coffee and cigarettes who show no inclination whatever to give some one else his turn to get a meal.

In the new-type eating-place, seats are side by side on a slowly moving conveyor belt. In front of the diner is another conveyor belt which is the table. There may also be a traveling footrest so that the patron's toes won't drag.

You sit down on an empty seat at the head of the line, as it pops up from beneath. A waitress sets before you the first course, which comes up on a dumb-waiter. You eat the first course as you are moved along. By the time you come opposite a second dumb-waiter, the second course appears in it; the waitress sets it before you and whisks away your empty dishes. Again you eat against time until you come opposite the third dumb-waiter, bringing up your dessert.

At the end of the run you vacate your seat. Or else.

It isn't wholly heartless and mechanical, at that. The inventors provide a lounge, where you may have your coffee and cigarette. But the next fellow does get a seat at the table.

U. S. patent 2,435,044 has been granted on this device.

Science News Letter, March 27, 1948

METEOROLOGY

Forecast Wave Conditions

Swell Forecasting Section had job of predicting sea conditions for amphibious landings during the war. They did "swell" job, Navy official indicates.

➤ THE story of a pioneering group of scientists who played an important but little-known role in the invasion of Normandy and in other amphibious landings in World War II was disclosed at a conference in New York on ocean surface waves held by the New York Academy of Sciences.

The group was known as the Swell Forecasting Section. These scientists had the task of predicting sea conditions for amphibious landings. They did a "swell" job, it was indicated in a report to the conference by Charles C. Bates of the U. S. Navy Hydrographic Office, Washington, D. C.

Early in the war, crude methods of forecasting wave conditions were developed. In 1943, military meteorologists were trained, and early in 1944, a joint Swell Forecasting Section was set up at the British Admiralty to make predictions of conditions in the English Channel as a part of the preparation for D-Day.

After the invasion of Normandy, wave forecasting continued and improved as an aid in the landing of troops and supplies. Mr. Bates said that relationships were worked out between the height of the waves and the tonnage of supplies unloaded and landing craft casualties.

Later the Swell forecasters were transferred to serve the British East Indies Fleet and the Southeast Asia Command. When the war ended, the scientists were completing plans for wave forecasting for the planned invasion of Kyushu, Japan.

Science News Letter, March 27, 1948

Wave Recorder Developed

➤ A new set of instruments which can record and analyze ocean waves at a point several miles offshore were described at the conference by Arthur A. Klebb of the Woods Hole Oceanographic Institution, Woods Hole, Mass.

Developed under contract with the Navy's Bureau of Ships, the equipment is portable and boasts minimum power requirements. Wave studies of seaplane landing areas and harbors may be important uses for the wave recorder, the scientist suggested.

Science News Letter, March 27, 1948

CHEMISTRY

Ethyl Alcohol Could Help In Gasoline Shortage

➤ ONE WAY to save gasoline in coming shortages is to use ethyl alcohol with it, Dr. G. E. Hilbert of the U. S. Department of Agriculture told the National Farm Chemurgic Council meeting in Omaha, Neb.

Blending one gallon of ethyl alcohol and nine gallons of low-grade gasoline will make 10 gallons of premium grade anti-knock motor fuel, he said. Or using a small gadget that automatically injects a mixture of alcohol and water into the engine when it is under heavy load will let a truck driver take the hills in high instead of at five miles an hour.

The use of alcohol as a motor fuel is not new. However, it depends upon price. At present prices of grain, alcohol is too expensive, he stated. But alcohol can be made from farm wastes such as corncobs, and progress is being made in the development of a process to yield a cheap product. He cited work at the department's Northern Regional Research Laboratory, Peoria, Ill., of which he is director, in developing a fungal amylase that is produced by a mold that can be grown on distillers' stillage.

The amylase thus produced served as a substitute for the malt commonly used. This, he said, would lower the cost of ethyl alcohol about three cents a gallon.

A process developed at the laboratory for making alcohol from corncobs was presented by Dr. Hilbert. It is the work of Drs. E. C. Lathrop and John W. Dunning. These studies are now being made on a semi-commercial scale. It will be at least another year before full evaluation will be complete. It is not a question of being able to turn cobs into alcohol, he stated, but that of producing the alcohol at a reasonable cost. One of the largest cost factors is the transportation of the raw material. Another item is to find a profitable use for the by-products.

Science News Letter, March 27, 1948

ENGINEERING

Efficient Engines Needed

They need to be designed for better operation on the fuel produced. Closer cooperation is necessary between the automobile and the petroleum industries.

➤ ECONOMY in the use of gasoline demands full cooperation between the automobile industry and the petroleum industry so that engines will be designed to operate most efficiently on the fuels produced, the Society of Automotive Engineers was told at a meeting in New York by William M. Holaday, director of Socony-Vacuum Laboratories.

It is generally agreed that the refining industry must be expanded to handle another 1,000,000 barrels of crude oil per day in order to meet anticipated demands, he said. For fullest cooperation, the automotive industry must be fully acquainted with the fuel-production situation and steps that must be taken to satisfy expanded requirements.

The current domestic consumption is over 5,000,000 barrels of crude a day. Known reserves are larger now than at any other time, he declared. In addition, a potential productive capacity based upon the utilization of natural gas and coal gives added assurance of continued supplies of liquid hydrocarbon products.

The fact that significant increases in the octane number of motor fuels may be several years off, because of the necessary expensive construction, should not in any way impede the progress that the automotive industry can make in designing and producing engines and cars with improved performance and economy, he stated.

A critical examination of the manner in which antiknock quality is now utilized, and of the effect that various design changes may have on antiknock requirements will point the way to the goal desired by both the petroleum and the automotive industries, as well as the passenger car operator.

As a result of tests with cars, he suggested significant changes in engine design which would be effective in decreasing peak octane number requirements. They include a momentary decrease in spark advance at low speeds as the car is accelerated, improvement in intake manifolding to improve mixture distribution to the cylinders, the use of rich mixtures during high power operation, improved combustion chamber cooling, and use of water injection.

Mr. Holaday suggested a dual fuel system on autos, which would meter two fuels according to demand. One would be fuel high enough in octane quality to satisfy peak requirements during full-throttle operation, and the other a fuel of lower quality for normal cruising operations.

Science News Letter, March 27, 1948

PHYSICS

Supersonic Air Pressure Measured by Light Waves

➤ LIGHT waves have been harnessed for a new job. They are being used to measure the pressure and temperature of air moving at supersonic speeds through a glass-walled wind tunnel, Dr. Rudolf Ladenburg of Princeton University has revealed.

In these tunnels, tiny models of airplanes, wing sections or missiles are suspended and air forced through at high speeds simulating conditions encountered in flight. Light is passed through the tunnel from one side to the other, and also over the outside of the tunnel.

An instrument called a Mach interferometer, a new development in wind tunnel optics, is used to measure the air conditions. The device splits a beam of light into two coherent wave trains, one of which passes through the wind tunnel and the other around it through a control chamber by means of mirrors. The two wave trains are recorded photographically, giving measurable optical effect.

In showing the action of a wing model on the air movement within a supersonic tunnel, what is called the "schlieren effect" has been used for several years. Dr. Ladenburg likened the schlieren effect to the glimmering above a pavement heated by strong sunlight due to air density changes.

The air movement, if traveling fast enough, builds up what are known as shock waves which seem to grasp the plane and hold it back. The shock waves can be photographed by schlieren photography. These are made by sending parallel rays of light crosswise through the tunnel above and below the model, and then into a camera.

The air in the shock wave is of a different density from that in other portions of the air flow and therefore refracts the light passing through it. When the light encounters the sensitized plate in the camera the refracted rays, no longer parallel to the others, make a record which is either a light or a dark spot.

Science News Letter, March 27, 1948

CHEMISTRY

Huge Metal Crystals Open New Field of Research

➤ "SUPER CRYSTALS" of metal created by University of Virginia chemists in Charlottesville, Va., are aiding research on surface chemistry which may help industry speed production or slow down corrosion.

Measuring up to one inch in diameter, the crystals are huge compared with millions of tiny crystals on the surface of ordinary metal. Because the sides of any crystal react differently to the same chemical process, the new, giant crystals are opening up a new field of research on metals.

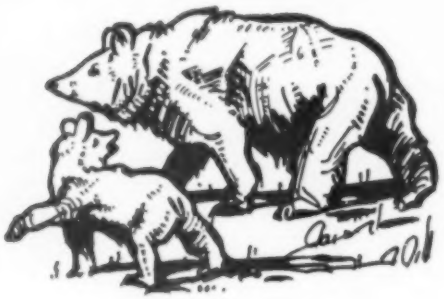
From this study may come crystal faces on metals which are suited to special uses in industry. Thus, crystal faces with low reactivity might be used to reduce corrosion. Highly reactive surfaces might be developed to speed up reactions in the production of many products.

Dr. Allen T. Gwathmey, research associate in chemistry at the University, developed the "super-crystals" with the assistance of advanced students.

Science News Letter, March 27, 1948

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone



Spring Awakenings

➤ SPRING, for most of us, signals its coming mainly with flowers and birds. We take notice sharply when we see the first dandelion or hear the first robin, and the good news is confirmed by the coming of the first bluebird and the opening of the first violet.

However, there are plenty of other creatures that have been missing all winter, and that begin to turn up about now. Although they belong to the animal kingdom, they have been more like the flowers than like the birds; they did not go south for the winter, but slept it out in burrows or nests or hidden chinks and crannies.

The "death-seeming sleep" of hibernation is resorted to by a wide variety of animals, and in a wide variety of ways. They range in evolutionary kinship all the way from worms and spiders to bats and bears, and their dormancy may be only a fitful few days at a time or it may be a solid unbroken slumber that lasts from the first frost to the last thaw.

There are very few safe generalizations about the winter sleep of any given class of animals. True, practically all reptiles and amphibia that live in wintry countries retire for the winter into burrows in the ground, or into the mud at the bottom of ponds and streams. But you cannot extend that generalization either up or down the evolutionary scale. Fish do not hibernate, and only a relatively small number of mammals do. It used to be thought that no birds indulged in winter sleep, but lately a number of cases have come to light that seem to indicate that some birds do have at least short periods of dormancy in cold weather.

Even among the warm-blooded animals that evade winter by sleeping, there is no set rule. Some of the ground-squirrels are such complete hibernators that if one of them is dug out of his burrow before he is ready to awaken he is very likely to be taken for dead. He will be limp and cold, with no perceptible pulse or breath. Shaking and noises have no effect on him—not even being struck with a pin will rouse him. Only several hours of slow warming will bring him to life.

Near the other extreme are the bears. They do retire into dens and are rarely seen again before spring. Yet they are known to emerge, for at least brief prowls, when a few bright, warm days interrupt the severity of winter. And in areas like the Gulf Coast, where winter troubles but little, they will scarcely hibernate at all.

Science News Letter, March 27, 1948

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

WYOMING

Ride, fish, geologize or just relax. How?

Paton Ranch will give you trout fishing in a mountain stream as it flows out of a canyon in the Big Horn Mountains, daily horseback rides along the picturesque trails and excellent food—most of which is grown on the ranch.

The region abounds in geological and historical interest—dinosaur bones, marine fossils and Indian implements are found nearby.

Write for folder—Paton Ranch, Shell, Wyoming.

PHYSICS

Close to Absolute Zero

➤ TEMPERATURES lower than ever obtained, close to absolute zero at which substances contain no heat, are expected at Rutgers University with the assistance of a six-ton electromagnet just completed for the institution by General Electric at Schenectady.

The electromagnet, claimed to be the largest and most powerful of its kind, is not so designed that it could be used for lifting purposes. But it has a magnetic force equivalent to some 40,000 pounds. The influence of a strong magnetic field on certain salts will remove heat, and such fields have been used in recent years in attempts to reach temperatures in the range of absolute zero.

Absolute zero, approximately 460 degrees below the ordinary zero on the Fahrenheit thermometer, is the theoretic temperature at which a substance loses all molecular motion and the body would be without any heat. It is an unattainable temperature, scientists say, but it has already been approached to within a small fraction of a degree.

Temperatures within a few degrees of absolute zero have been obtained at the university with a complicated machine known as the Collins helium cryostat, named after its designer, Dr. Samuel Collins of the Massachusetts Institute of Technology, and built by Arthur D. Little, Inc., of Cambridge, Mass.

This device works somewhat like the ordinary household refrigerator. Highly compressed helium gas is forced through a tiny jet. The cryostat, in addition, makes the helium gas used in it operate a piston-driven engine as another means of cooling the gas. For lower temperatures than obtainable with it the magnetic method is used.

This method utilizes what is called the magnetic cooling cycle. The magnetic field is said to influence the inner core of the atom instead of the cloud of electrons about it. The influence of the magnetic field upon the spinning atoms makes possible the drop in temperature. When a piece of soft iron, for instance, is demagnetized by taking the magnetic field away from it, it absorbs heat.

This new G. E. electromagnet is 56 inches long, 39 inches wide and 20 inches high. The electromagnet's two coils are 36 inches in diameter. They are precision built, with the pole faces almost perfectly parallel. The instrument will be used also to study magnetic susceptibility at extreme low temperatures and nuclear magnetic properties of various isotopes.

Science News Letter, March 27, 1948

Science Service Radio

➤ LISTEN in to a discussion on science and education in the Middle South on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 3. Dr. Rufus Harris, president of Tulane University, Dr. Joseph Morris, vice-president, and Dean Fred Cole, dean of College of Arts and Sciences, will be guests of Watson Davis, director of Science Service. The program will be in connection with the launching of an area development of the Middle South.

Science News Letter, March 27, 1948

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. In the case of free publications order direct from issuing organizations.

AIRCRAFT STRUCTURAL ANALYSIS—G. N. Mangurian and Norman M. Johnston, Eds.—*Prentice-Hall,* 418 p., illus., $8.00. Prepared by the engineering staff of the Glenn L. Martin Company.

THE AMERICAN PEOPLE: A Study in National Character—Geoffrey Gorer—*Norton,* 246 p., $3.00. A way of seeing ourselves as others see us—this time through the eyes of a British anthropologist.

THE ARCHITECTS MANUAL OF ENGINEERED SOUND SYSTEMS—*Radio Corporation of America,* 288 p. illus., loose-leaf with tab index, $5.00. Including sound symbols, definitions and specifications with suggested applications of sound systems and typical layouts.

CHEMISTRY AT WORK—William McPherson, William Edwards Henderson and George Winegar Fowler—*Ginn,* rev. ed., 676 p., illus., $2.88. An abundantly illustrated high-school text that is both attractive and interesting.

CHEMISTRY IN THE SERVICE OF MAN—Alexander Findlay—*Longmans, Green,* 7th ed., 390 p., illus., $3.50. Giving the general reader an understanding of the implications and usefulness of modern advances in chemical science.

CHRISTIAN HUYGENS AND THE DEVELOPMENT OF SCIENCE IN THE SEVENTEENTH CENTURY—A. E. Bell—*Longmans, Green,* 220 p., illus., $4.50. The biography of a great scientist one of whose achievements was the discovery of the rings of Saturn.

COMPENDIO Y DESCRIPCION DE LAS INDIAS OCCIDENTALES—Antonio Vazquez de Espinosa, transcribed from the original manuscript by Charles Upson Clark—*Smithsonian Institution,* 801 p., paper. A very ancient work about the Americas rediscovered in the library of the Vatican. In Spanish.

THE CONTROL OF ATOMIC ENERGY: A Study of Its Social, Economic, and Political Implications—James R. Newman and Byron S. Miller—*McGraw-Hill,* 434 p., $5. The senior author has acted as White House adviser on science and atomic energy legislation. A "must" book on the atomic energy shelf.

ELEMENTS OF NOMOGRAPHY—Raymond D. Douglass and Douglas P. Adams—*McGraw-Hill,* 209 p., illus., $3.50. Although written especially for students of mathematics, it will interest all those concerned with putting mathematical or statistical facts in graphic form.

EMANUEL SWEDENBORG—Signe Toksvig—*Yale University Press,* 389 p., illus., $5.00. This biography was made possible by a Guggenheim fellowship. The life of Swedenborg had many facets, one of which was science.

ENERGY SPECTRA OF SOME OF THE BRIGHTER STARS—C. G. Abbot and L. B. Aldrich—*Smithsonian Institution,* 9 p., illus., paper, 15 cents.

THE ESSENTIAL OILS: Vol. 1, History, Origin in Plants, Production, Analysis—Ernest Guenther—*Van Nostrand,* 427 p., illus., $6.00. A systematic survey.

HANDBOOK ON INSECT ENEMIES OF FLOWERS AND SHRUBS—C. A. Weigel and L. G. Baumhofer—*Govt. Printing Office,* 115 p., illus., paper, 35 cents. With an appendix on DDT.

THE HOUSE FOR YOU TO BUILD, BUY, OR RENT—Catherine Sleeper and Harold R. Sleeper—*Wiley,* 313 p., illus., $5.00. About picking the site, planning the home, and understanding the mechanical features and the quality and cost of materials.

HEALTH OF ARC WELDERS IN STEEL SHIP CONSTRUCTION—Waldemar C. Dressen and others—*Govt. Printing Office,* 200 p., illus., paper, 55 cents. A survey made by the U. S. Public Health Service in cooperation with United States Maritime Commission and United States Navy.

HIROSHIMA—John Hersey—*Bantam,* 116 p., paper, 25 cents. A reprint of a best-selling story of five survivors of an atomic bombing; it originally appeared in the New Yorker.

MENTAL HEALTH IN MODERN SOCIETY—Thomas A. C. Rennie and Luther E. Woodward—*Commonwealth Fund,* 424 p., $4.00. "War," say the authors, "warps the emotions and personalities of many who wage it and of many who watch." This book describes experience in re-building mental health.

MINERAL RESOURCES IN THE UNITED STATES—Bureau of Mines and Geological Survey—*Public Affairs Press,* 212 p., illus., $5.00.

MODERN PRACTICAL CHEMISTRY—A. E. Bell—*Longmans, Green,* 224 p., illus., $2.00. A text prepared for British students.

ORGANIC CHEMISTRY—Ray Q. Brewster—*Prentice-Hall,* 840 p., illus., $7.35. An outgrowth of experience in teaching organic chemistry to undergraduates in terms of the electronic and resonance theories.

OUR PLUNDERED PLANET—Fairfield Osborn—*Little, Brown,* 217 p., $2.50. Having to do with the heedless destruction of natural resources.

PSYCHOSOCIAL MEDICINE: A Study of the Sick Society—James L. Halliday—*Norton,* 278 p., $3.50. The author points out that the nation or the community, like the individual, has its physical ills linked with psychological sickness.

PUPIL PERSONNEL SERVICE—Frank G. Davis, Ed.—*International Textbook Company,* 638 p., $3.75. Designed to aid counselors, school administrators and others in making education more personalized.

RESEARCH IN INDUSTRY: Its Organization and Management—C. C. Furnas, Ed.—*Van Nostrand,* 574 p., illus., $6.50. Prepared by the Industrial Research Institute, Inc., for those interested in organizing or administering industrial research facilities.

SCIENCE YEAR BOOK OF 1948—J. D. Ratcliff, Ed.—*Doubleday,* 243 p., $3.00. Articles selected from various popular magazines.

YOU CAN BE THIN! Slenderness Through Psychology — Herman Friedel — *Caxton House,* 117 p., $2.00. Some points on the psychology of obesity with more on diet.

Science News Letter, March 27, 1948

ENGINEERING

Pacific Tides at Panama Higher than Atlantic

➤ THE average tidal range on the Pacific side of the Panama canal for years of record is 12.6 feet, it is stated in a prewar publication distributed by the Chief of Office, The Panama Canal. The greatest range recorded for successive tides is 21.6 feet.

On the Atlantic side, the average range is less than a foot, the leaflet states, while the greatest range recorded is 2.21 feet. Figures in the report of the Governor of the Panama Canal to the Secretary of War for the year ended June 30, 1946, show that during the year absolute tidal ranges at canal terminals were 21.5 feet on the Pacific coast and 2.46 feet on the Atlantic side.

These figures are given to correct an error in the SCIENCE NEWS LETTER for February 7, 1948, in which it was said that a proposed sealevel canal would be lockless except for one low construction to handle the approximately one-foot different tide elevations of the two oceans. The one-foot difference is that of mean sealevel rather than of tide elevations.

Science News Letter, March 27, 1948

ANYONE CAN USE A SLIDE RULE

Absolutely no math background needed if you have the PRACTICAL SLIDE RULE MANUAL by J. M. Klock, formerly Mathematician for the U. S. Navy and instructor in the Detroit Public Evening Schools. An absolutely non-technical explanation of how to use a slide rule for the fundamental math calculations. STUDENTS of all math, science, and technical subjects will find the use of a slide rule to be a great aid in their work. SHOP AND TECHNICIANS: special applications made to formulae from mathematics, engineering, aeronautics, air navigation, etc. The slide rule gives rapid solutions to all the basic formulae. OFFICE: and business administration applications are numerous. The slide rule is especially valuable in per cent and interest work, and cost accounting. The booklet includes chapters on these subjects. The slide rule is also a valuable rapid estimator.

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❁ *GREASE FILTER, for installation in the canopy over a cooking range, is a conical steel screen that traps the grease vapors as they arise from the cooking, condenses them and lets the liquid drop into a cup. It prevents the grease from collecting in the flue where it is a serious fire hazard.*

Science News Letter, March 27, 1948

❁ *LIGHTWEIGHT LAWNMOWER, which looks like a carpet sweeper, has small rubber-tired wheels instead of heavy metal ones, and a light metal frame. It cuts a 17-inch swath, and can be used easily under overhanging shrubbery because of its special cover guard.*

Science News Letter, March 27, 1948

❁ *SEALED BEAM headlamps for locomotives are similar to those used on automobiles but contain two lamps that develop together 400,000 candlepower. The cover glass is all that ever needs cleaning because the filament, the highly accurate reflector and the clear cover glass are a single unit.*

Science News Letter, March 27, 1948

❁ *PUMP-SCAFFOLD brackets ease the job of repair work or painting inside or outside walls. One platform only is needed, together with two four-inch square uprights with a pump-bracket on each. The platform is raised or lowered by two workmen on it by manipulating the handles of the pumps.*

Science News Letter, March 27, 1948

❁ *INSIDE-OUT MOTOR, shown in the picture, has its rotating part on the outside and its stationary part on the inside, unlike ordinary electric motors. It*

was designed especially for use inside a missile to cause it to spin at a rapid rate.

Science News Letter, March 27, 1948

❁ *NON-CURL CARBON paper for typists has a vinylite plastic back coating, which improves moisture resistance and flexibility and adds to the strength of the tissue. The non-curl feature hastens handling by users in insertions and removals.*

Science News Letter, March 27, 1948

❁ *TREE-PULLING apparatus, recently patented, has a pair of jaws on arms to the rear of a truck which grasps the tree trunk near the ground. A pulling cable, which passes over a pulley on an upright braced to the truck, is powered by an engine and winch on the vehicle.*

Science News Letter, March 27, 1948

❁ *REFRIGERATING SYSTEM for trucks engaged in hauling perishable foods operates on a 115-volt generating unit driven by a small gasoline engine while on the road, and is plugged into a municipal line when standing during stop-overs. The system is in an insulated case in the front section of the truck trailer.*

Science News Letter, March 27, 1948

Soilless Gardening Hobby Kit For You

Contains everything needed to start growing vegetables and flowers. Pots are easily assembled, chemicals to feed growing plants, shiny mica material for roots to cling to, seven kinds of specially selected seeds. Grow seedless fruit, sprout roots on stems, experiment with colorful plastic tents for light-growth tests.

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Initials

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Photographs: Cover, Navy; p. 195, Westinghouse Electric Corp.; p. 197, Yale Univ.; p. 199, General Electric.